



Climate change effects on trematodiasis, with emphasis on zoonotic fascioliasis and schistosomiasis

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Abstract:

The capacity of climatic conditions to modulate the extent and intensity of parasitism is well known since long ago. Concerning helminths, among the numerous environmental modifications giving rise to changes in infections, climate variables appear as those showing a greater influence, so that climate change may be expected to have an important impact on the diseases they cause. However, the confirmation of the impact of climate change on helminthiasis has been reached very recently. Only shortly before, helminthiasis were still noted as infectious diseases scarcely affected by climate change, when compared to diseases caused by microorganisms in general (viruses, bacteriae, protozoans). The aim of the present paper is to review the impact of climate change on helminthiasis transmitted by snails, invertebrates which are pronouncedly affected by meteorological factors, by focusing on trematodiasis. First, the knowledge on the effects of climate change on trematodiasis in general is reviewed, including aspects such as influence of temperature on cercarial output, cercarial production variability in trematode species, influences of magnitude of cercarial production and snail host size, cercarial quality, duration of cercarial production increase and host mortality, influence of latitude, and global-warming-induced impact of trematodes. Secondly, important zoonotic diseases such as fascioliasis, schistosomiasis and cercarial dermatitis are analysed from the point of view of their relationships with meteorological factors. Emphasis is given to data which indicate that climate change influences the characteristics of these trematodiasis in concrete areas where these diseases are emerging in recent years. The present review shows that trematodes, similarly as other helminths presenting larval stages living freely in the environment and/or larval stages parasitic in invertebrates easily affected by climate change as arthropods and molluscs as intermediate hosts, may be largely more susceptible to climate change impact than those helminths in whose life cycle such phases are absent or reduced to a minimum. Although helminths also appear to be affected by climate change, their main difference with microparasites lies on the usually longer life cycles of helminths, with longer generation times, slower population growth rates and longer time period needed for the response in the definitive host to become evident. Consequently, after a pronounced climate change in a local area, modifications in helminth populations need more time to be obvious or detectable than modifications in microparasite populations. Similarly, the relation of changes in a helminthiasis with climatic factor changes, as extreme events elapsed relatively long time ago, may be overlooked if not concretely searched for. All indicates that this phenomenon has been the reason for previous analyses to conclude that helminthiasis do not constitute priority targets in climate change impact studies.

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Resource Description

Climate Change and Human Health Literature Portal

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease, Vectorborne Disease

Foodborne/Waterborne Disease: Fascioliasis, Helminthiasis, Schistosomiasis

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Methodology, Other Projection Model/Methodology

Other Projection Model/Methodology: discussion only

Resource Type:

format or standard characteristic of resource

Review

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content